BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

In the Matter of	)	
	)	
PUBLIC UTILITIES COMMISSION	)	DOCKET NO. 2008-0273
	)	
Instituting a Proceeding to Investigate the Implementation of Feed-in Tariffs	)	
	)	

RESPONSES OF
ZERO EMISSIONS LEASING LLC
TO NON-THRESHOLD QUESTIONS
IN APPENDIX C TO THE NRRI SCOPING PAPER

AND

CERTIFICATE OF SERVICE

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RESPONSES OF ZERO EMISSIONS LEASING LLC TO NON-THRESHOLD QUESTIONS IN APPENDIX C TO THE NRRI SCOPING PAPER

ZERO EMISSIONS LEASING LLC ("Zero Emissions") respectfully submits the following answers and information responsive to the non-threshold questions contained in Appendix C: Questions to the National Regulatory Research Institute (NRRI) scoping paper titled *Feed-in Tariffs: Best Design Focusing Hawaii's Investigation* (the "Scoping Paper").

Zero Emissions will not submit its own information responsive to Appendix A: Cost Data Forms to the NRRI Scoping Paper, but hereby joins in any responses by the Solar Alliance and/or the Hawaii Solar Energy Association to Appendix A to the NRRI Scoping Paper.

Process and General Feed-in Tariff Issues

5. Please explain the criticality of completing the "best-design" phase of this investigation by March 2009 and having project-based FiTs in place by July 2009 as called for in the Agreement.

   Response: Completion of the "best-design" phase by March 2009 and implementation by July 2009 is critical because delay and uncertainty that slow the speed of renewable energy development in Hawaii could have catastrophic effects in the event of any interruption of Hawaii energy imports.

6. Please explain why project-based FiTs are superior to other methods that require a utility to purchase renewable electricity.

   Response: Project-based FiTs are superior to RPS quotas for the rapid development of large-scale utility-distributed RE generation at lowest cost to the public because: (1) price and revenue certainty of FiTs encourage the development of large-scale RE projects, (2) customer certainty of FiTs encourage the rapid development of RE projects, (3) no quota to limit the quantity of RE generation encourages rapid development of RE generation, (4) utility-sponsored RE projects eligible for FiT encourages rapid RE development, (5) the subsidy cost to ratepayers of the FiT is substantially less than the subsidy cost to ratepayers of REC-type rebates under RPS, (6) FiT encourages diversity of renewable energy sources and rapid RE development, lowering the risk and therefore, the cost to the public of RE development, (7) FiT is transparent, unlike utility decision-making under RPS, lowering risk and costs to public of RE development, and (8) FiT is a performance incentive, encouraging maximum output per dollar of subsidy cost to the ratepayer and thus lowering the subsidy cost to the ratepayer.

7. Please quantify the costs over avoided costs of an open-ended PBFiT program assuming the utility meets the RPS goals set forth in the Agreement.

   Response: Zero Emissions lacks data that would be needed to quantify open-ended PBFiT program costs over avoided costs assuming the utility meets the RPS goals set forth in the Agreement.

   The net ratepayer subsidy cost of a Hawaii FiT, assuming the utility meets the RPS goals set forth in the Agreement (25% by 2020), can be estimated as follows. In the white paper, *Feed-in Tariff Case Studies*, prepared for the U.S.Department of Energy and the State of Hawaii in support of the Hawaii Clean Energy Initiative[1], the author reports that the increased cost, as of 2008, to German

[1] Douglas Hinrichs, *Feed-in Tariff Case Studies: A White Paper in Support of the Hawaii Clean Energy Initiative* (Sentech, Inc. September 2008).

ratepayers as a result of the German FiT has been €.007 (or US $.01) per kWh.[2] As of 2008, Germany had achieved approximately 14% of kWh from renewable sources, of which approximately ¾ came from wind and ¼ came from solar. If Hawaii establishes a feed-in tariff having the same FiT rates as the German FiT over the same 20 year term, and if the Hawaii utility meets the 25% by 2020 goal using wind and solar in the same proportion as Germany, it may be estimated that the increased cost to Hawaii ratepayers as a result of the Hawaii FiT would be about $.01/kWh multiplied by 25% divided by 14%, or about $.02/kWh.

8. Please quantify the benefits of lowering oil imports, increasing energy security, and increasing both jobs and tax base for the state mentioned in the Agreement.

Response: The cost of total Hawaii oil imports represent a cash outflow from the State of Hawaii of anywhere from about $5 billion to $7 billion per year, depending on the global price of oil, or about 10% of Hawaii's gross domestic product. Approximately 30% of Hawaii's oil imports are used for electric power generation at a cost of about $1.5 billion to $2 billion per year. Therefore, each 1% of RE generation that displaces 1% of oil-fired generation reduces Hawaii's cost of oil imports by about $15 million to $20 million per year.

Almost 80% of Hawaii's electricity is generated with oil, and 100% of that oil is imported. Hawaii's tourism industry is completely dependent on electricity as demonstrated by recent power outages. At any given time, Hawaii has only 2 to 4 weeks supply of oil for electricity generation. Any prolonged interruption in the supply of oil to Hawaii would have catastrophic effects on Hawaii's electricity supply, Hawaii's tourism industry and Hawaii's economy in general. Achieving rapid large-scale RE generation would increase Hawaii's energy security and mitigate the catastrophic effects of oil supply interruption. Increasing Hawaii's energy security through the rapid large-scale development of RE generation at low cost to the public is the principal reason for establishing a FiT.

For photovoltaics, it has been estimated that each 1 MW of installed PV creates 8 jobs in the locale where the system is installed. The installation of 500 MW of PV in Hawaii might result in the creation of 4,000 jobs.

9. Is the goal to encourage as much use of renewable resources as possible as soon as possible, or is it to encourage the orderly introduction of renewable resources based upon cost effectiveness?

Response: Neither. The goal is to encourage rapid large-scale development of renewable energy resources at the lowest cost to the public, to reduce and eliminate, as soon as possible, Hawaii's dependence on imported energy sources.

[2] Marcus Maedl, "The German FIT for Renewable Energy – A Bargain!" *Renewable Energy World* (April 14, 2008) http://www.renewableenergyworld.com/rea/news/reinsider/story?id=52126

10. How long a period should exist between mandatory Commission reviews of the PBFiTs?

Response: 2 years.

PBFiT General Design Issues

11. Do each of the technologies listed as a renewable resource in the RPS legislation require a PBFiT?

Response: No. The "biofuels" and "hydrogen" categories of "renewable energy" under HRS § 269-91 do not require a PBFiT because technologies using these sources are not commercially proven. The "municipal solid waste" category of "biomass" under HRS § 269-91 does not require a PBFiT because this source is not a renewable resource in fact.

12. Should PBFiTs for certain technologies be established now while others are deferred?

Response: PBFiTs should be established now for the following commercially-proven technology types:

Biomass or biogas
Geothermal energy
Landfill gas or sewage treatment plant gas
Hydropower
Photovoltaic
Concentrating solar
Onshore wind
Offshore wind

PBFiTs for other technology types should be deferred until they are commercially proven (e.g., ocean thermal, biofuels, hydrogen)

13. Should the Commission cap purchases under PBFiTs?

Response: Yes.

If yes, what is the maximum amount?

Response: Grid penetration of wind power (onshore and offshore) should be capped at 25% of peak demand.[3] Grid penetration of solar power (photovoltaic and concentrating solar) should be capped at 50% of peak demand.[4]

Should individual caps be set for each technology?

Response: Only for aggregate wind and aggregate solar.

What period should the cap cover?

Response: Grid penetration caps should apply only when grid penetration percentage is reached.

What is the measurement for the cap (e.g., dollars, percent of sales, kW, or kWh)?

Response: Megawatts (MW) of generating capacity and peak demand.

14. What limitations exist for integrating renewable resources onto the grid?

Response: The intermittent nature of wind and solar limits the amount of wind and solar generation that can be integrated onto the grid because certain percentages of firm generation are needed to compensate for variations in wind and solar generation while maintaining high levels of reliability.

Should these limits affect the PBFIT design or caps, or are they just another cost that developers must consider?

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[3] *See* B. Parsons, M. Milligan, J.C. Smith, E. DeMeo, B. Oakleaf, K. Wolf, M. Schuerger, R. Zavadil, M. Ahlstrom and D. Yen Nakafuji, "Grid Impacts of Wind Power Variability: Recent Assessments from a Variety of Utilities in the United States," National Renewable Energy Laboratory Conference Paper NREL/CP-500-39955 (July 2006) http://www.uwig.org/Ewec06gridpaper.pdf ; J.C. Smith, B. Parsons, T. Acker, M. Milligan, R. Zavadi, M. Schuerger and E. DeMeo, "Best Practices in Grid Integration of Variable Wind Power: Summary of Recent US Case Study Results and Mitigation Measures," presented at Europe Wind Energy Conference '07, Milan Italy (May 2007) http://www.wapa.gov/UGP/PowerMarketing/WindHydro/EWEC07paper.pdf.

[4] *See* E. Liu and J. Bebic, "Distribution System Voltage Performance Analysis for High-Penetration Photovoltaics," National Renewable Energy Laboratory Subcontract Report NREL/SR-581-42298 (February 2008) http://www.nrel.gov/docs/fy08osti/42298.pdf ; R. Perez, R. Margolis, M. Kmiecik, M. Schwab and M. Perez, "Update: Effective Load-Carrying Capability of Photovoltaics in the United States," National Renewable Energy Laboratory Conference Paper NREL/CP-620-40068 (June 2006) http://www.nrel.gov/docs/fy06osti/40068.pdf .

Response: These limits affect the PBFiT caps because it does not make economic sense to subsidize wind and solar generation beyond a point at which wind and solar generation cease to substitute for fossil fuel or renewable forms of firm generation.

Specific Tariff Design Issues

15. How long should the Commission set for the PBFiT's term of obligation?

Response: 20 years for all technology types, except hydropower should have a 30 year term. This is the term structure that has been successful in Germany.

Should it be different for different technologies?

Response: No, except a 30 year term for hydropower.

Is there a common basis (e.g., a conservative estimate of expected useful life) for establishing the term of obligation?

Response: No.

On what basis should a utility pay for electricity after the term expires?

Response: After the term expires, a utility should pay for electricity on the basis of whatever regulatory framework exists at that time.

16. Should PBFiTs require the utility to purchase the project's gross or net output at the PBFIT price?

Response: The utility should be required to purchase the project's net output at a PBFiT price that reflects net energy consumption that is typical for the technology type of the project.

17. How should the utility determine the price paid for renewable energy not covered by a PBFiT (e.g., purchases above the cap or beyond the term of obligation)?

Response: The utility should determine the price paid for renewable energy not covered by the PBFiT within whatever regulatory framework exists at the time of the determination. That framework might be a future PBFiT or a competitive bidding/negotiated price framework.

18. What inflation adjustment, if any, should the PBFiT include, using what base and indexes?

Response: None. The Commission should review the PBFiTs every two or three years to determine whether adjustments are appropriate based on economic, technological and market changes during the immediately preceding two or three year period, including changes in the Producer Price Index.

19. What milestones (e.g., commercial operations) should the Commission set to determine eligibility for the PBFiT?

Response: The Commission should use the following queue management strategies to determine project eligibility for the PBFiT[5]:

(1) Reservation priority using a "first-ready, first-served" approach. A transmission connection request must continue to earn its ordinal position in the transmission queue or risk moving to the back of the line;

(2) Up-front payments of a magnitude sufficient to let economics dictate which projects should drop out of the queue;

(3) Open season that invites all projects to submit requests for interconnection and imposing contingencies as part of the acceptance;

(4) Strict suspension requirements that allow the Commission to release inactive projects from the queue in a timely manner.

Are Hawaii's RPS statute requirements an eligibility requirement?

Response: No.

[5] *See* Working group for Investment in Reliable & Economic electric Systems (WIRES), Integrating Locationally-Constrained Resources Into Transmission Systems: A Survey of U.S. Practices (October 2008) http://www.wiresgroup.com/images/WIRES_Report_LCR.pdf ; 124 FERC ¶ 61,183, Midwest Independent Transmission System Operator, Inc., Docket No. ER08-1169-000, Order Conditionally Accepting Tariff Revisions and Addressing Queue Reform (August 25, 2008) http://elibrary.ferc.gov/idmws/doc_info.asp?document_id=13641108

Should utility affiliates be eligible to receive the PBFiT price?

Response: Yes.

20. Please comment on the need for stepped tariffs based upon location, size, fuel mix, and output.

Response: Feed-in tariffs should be differentiated by technology type and size, not location, fuel mix or output. Zero Emissions expects to submit straw feed-in tariff sheets, based on the current German feed-in tariff schedules, that differentiate primarily by technology type and size.

21. Under what circumstances should the PBFiT price be time-differentiated?

Response: None. Time-differentiation would increase the uncertainty of the project's revenue stream, reducing the incentive effect of the PBFiT.

22. How highly leveraged (i.e., bearing how much debt compared to equity) are these projects?

Response: PBFiT projects tend to be highly leveraged (e.g., up to 80% of project cost) because the PBFiT increases the revenue stream certainty and lowers the project financial risk. Low financial risk makes the project eligible for debt financing, the interest cost of which is tax deductible.

23. Does a PBFiT create a financing environment through a reliable revenue stream from the ratepayer to the investor, allowing for greater leverage and thus lower cost financing than would be available under an avoided-cost tariff?

Response: Yes.

24. If the PBFiTs are to encourage early development of resources, does the reasonable return need to be set higher for these early tariffs?

Response: PBFiTs are intended to encourage *rapid* development of renewable energy resources. That may not mean the same thing as development of renewable energy resources using *early*-stage technologies. The PBFiT needs to be set high enough for each *commercially-proven* technology type to encourage

rapid development of renewable energy generation using that technology. Feed-in tariffs, as successfully used in Germany and other countries, have not been designed to encourage investment in early-stage technologies that have not been commercially proven.

Are there reasons other than encouraging early development to set the profit margin higher, such as risks associated with early implementation?

Response: Yes. The PBFiT rate needs to be set sufficiently high for each *commercially-proven* technology type to provide a profit margin that encourages *rapid* development of projects using that technology. The FiT, as successfully used in Germany and other countries, is not designed to encourage investment in projects using early-stage, non-commercially proven technologies.

Is this true across all project classes?

Response: No. The PBFiT should apply only to project classes using *commercially-proven* technologies.

25. Does the current "credit crunch" affect the financing costs, including expected profits by equity investors?

Response: No, for projects developed by Zero Emissions. Zero Emissions cannot speak for other project developers.

Related Issues

26. Please provide a quantitative analysis demonstrating the public interest aspect of the concept that 10% of the utility's purchases under the feed-in tariff PPA should be included in the utility's rate base through 2015. In addition to the overall prudence of the rate base recommendation, please address the 10% and 2015 date included in the Agreement.

Response: Zero Emissions interprets the Agreement to mean that 10% of the utility's purchases under a feed-in tariff would be added to the utility's rate base, in *addition* to 100% of the utility's purchase costs being passed along to ratepayers. Zero Emissions perceives no benefit to the public from such a concept. The 10% addition to the utility's rate base through 2015 appears designed to impose added costs on ratepayers solely to enhance the utility's profits.

27. What is the appropriate rate of return for the PBFiT portion of rate base that consists of a mandated purchase with guaranteed recovery and no capital outlay?

Response: The appropriate rate of return to the utility for the PBFiT portion of rate base consisting of mandated purchase with guaranteed recovery and no capital outlay should be no greater than the utility's historical rate of return on rate base consisting of purchases from independent power producers such as Puna Geothermal Venture or Kaheawa Wind.

28. Are there preferable utility incentives, other than putting PBFiT revenues into the rate base, to encourage the development of renewable resources?

Response: The utilities should be permitted to use unregulated subsidiaries to develop renewable energy projects qualifying for PBFiT.

29. Should the PBFiT require developers to assign credits (e.g., investment tax credits, renewable energy credits, and carbon credits) earned from a project to the purchasing utility as a condition of receiving payments under the PBFiT?

Response: No. To the extent that credits are established by Hawaii state law or regulation (*e.g.* the renewable energy technology income tax credit, and RECs resulting from fixed penalty for RPS compliance), such laws and regulations should be amended so that is prohibited from claiming such credits, to minimize the cost to the public

If not, how should these credits be included in the estimation of a typical project's cost?

Response: Hawaii state credits should not be included in the estimation of a typical project's cost. PBFiTs for projects eligible for federal tax credits might be discounted to fairly reflect the extent to which such federal credits offset the typical project's cost.

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DATED: Honolulu, Hawaii, January 26, 2009

Erik Kvam

Erik Kvam
Chief Executive Officer
Zero Emissions Leasing LLC

CERTIFICATE OF SERVICE

I hereby certify that I have this date filed and served the original and eight copies of the foregoing **RESPONSES OF ZERO EMISSIONS LEASING LLC TO NON-THRESHOLD QUESTIONS IN APPENDIX C TO THE NRRI SCOPING PAPER** in Docket No. 2008-0273, by hand delivery to the Commission at the following address:

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I hereby further certify that I have this date served two copies upon the following party of the foregoing **RESPONSES OF ZERO EMISSIONS LEASING LLC TO NON-THRESHOLD QUESTIONS IN APPENDIX C TO THE NRRI SCOPING PAPER** in Docket No. 2008-0273, by causing such copies or copy thereof to be mailed, postage prepaid, and properly addressed to each such party as follows:

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I hereby further certify that I have this date served one copy upon each of the following parties, of the foregoing **RESPONSES OF ZERO EMISSIONS LEASING LLC TO NON-THRESHOLD QUESTIONS IN APPENDIX C TO THE NRRI SCOPING PAPER** in Docket No. 2008-0273, by causing each such copy thereof to be sent via e-mail in a portable document format ("pdf") to each such party as follows:

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